

## X-RAY

### GUIDE FOR SUBMISSION OF INFORMATION NECESSARY THE EVALUATION OF RADIATION SHIELDING REQUIRED FOR PLAN REVIEWS

#### INTRODUCTION

Alabama Radiation Protection Rules require that prior to construction, the floor plans and a description of the equipment of all installations utilizing x-rays for diagnostic or therapeutic purposes shall be submitted to the Agency for review and approval. Requirements of the Rules are denoted in Appendices B and C of Rule 420-3-26-.05.

Modifications to an existing room or structure, change in equipment, change in procedures, an increase in the number and/or type of exposures, etc., may require subsequent review of and modification of shielding design.

It is extremely important that you recognize the necessity of submitting the required information to the Agency for review as early and as complete as possible and before any construction or room modifications take place. Plan reviews take considerable staff time to review. Delays in submittal will not be compensated for by "special staff review". A minimum of six (6) weeks after receipt should be allotted for review, provided a complete submittal is filed.

#### PURPOSE OF GUIDE

This guide is intended to provide you with step-by-step instruction for filing plans for radiation shielding review with the Agency. Please note that additional information may be required if needed. In most cases it is recommended that you secure the services of a qualified expert to assist in preparing the information needed for plan reviews.

#### INSTRUCTIONS

Following is a list of the information which should be considered for including in plan reviews applications submitted to the Agency. You should use this list to make sure that every applicable area has been considered. Again, incomplete applications will result in delayed plan reviews and approvals.

For each item on the following pages, ask yourself the question, "has this item been appropriately addressed in this plan review submittal?" If yes, indicate so on the form. If the item does not apply, indicate "NA" as non-applicable on the form

USE THIS FORM AS A CHECK LIST TO VERIFY THAT ALL ITEMS HAVE BEEN CONSIDERED. RETURN A COPY OF THIS FORM WITH YOUR PLANS.

BE SURE THAT YOUR SUBMITTAL INCLUDES  
THE FOLLOWING ITEMS AS APPROPRIATE

ITEM INCLUDED IN SUBMITTAL	FOR AGENCY USE ONLY
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I. Submit scale drawings or sketches which clearly demonstrate the following:		
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| a. Normal location of the radiation<br>producing equipments port. |  |  |
| b. The ports travel and traverse limits.                          |  |  |
| c. General direction(s) of the radiation<br>beam.                 |  |  |
| d. Location of any windows.                                       |  |  |
| e. Location of the operators booth.                               |  |  |
| f. Location of the equipment console.                             |  |  |

II. Identify:		
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| a. Structural composition and thickness<br>of all walls, partitions, doors, floor<br>(if above ground), and ceiling(s) of<br>the rooms concerned. |  |  |
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III. Specify:		
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| a. The height (and all variations), floor<br>to floor of the room(s) concerned.                                  |  |  |
| b. The type of occupancy of all adjacent<br>areas, including the space above and<br>below the room(s) concerned. |  |  |
| c. The name of the manufacturer and model<br>number of the x-ray equipment.                                      |  |  |
| d. The maximum energy output of the x-ray<br>unit in kilovolts potential (kVp).                                  |  |  |
| e. The type of examination(s) or treatment<br>to be performed (e.g., dental, chest,<br>fluoroscopy, cysto, etc.) |  |  |

IV. Submit information on the anticipated workload used in shielding calculations for each x-ray unit which includes:		
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| a. Expected average number of patients to<br>be x-rayed each week. |  |  |
| b. Expected average number of exposures<br>per patient.            |  |  |
| c. Average exposure time per patient.                              |  |  |

d. Maximum milliamperage of the x-ray unit(s).		
e. Average milliamperage per exposure.		
V. Submit a copy of the report used by the qualified expert to determine shielding requirements which clearly shows all basic assumptions used such as workload, occupancy and use factors, distances used, etc.		
VI. Specific requirements for the operators booth are listed in Rule 420-3-26-.05, Appendix C. Plans submitted for review must clearly enable the reviewer to conclude that:		
a. The booth has at least 7.5 square feet of unobstructed floor space with no dimensions less than 2 feet. Overhangs of consoles, shelves, cables, etc., shall not infringe on the required floor space.		
b. The operators station at the control panel shall be behind a protective barrier, or  Be in a separate room, or  Be in a protected booth, or  Be behind a protective shield (permanently fixed to the floor if a permanent location).  <u>NOTE:</u> The operators station shall be so located that radiation which has been scattered only once cannot reach the operator.		
c. Booth walls and shield shall be at least 7 feet high and permanently fixed to the floor or other structure.		
d. If a door or movable panel is used as an integral part of the booth structure, it shall be interlocked to prevent an exposure when the door or panel is not closed (not recommended).		
e. For radiographic machines, the operators switch shall:  Be fixed to the booth.  Be 30 inches from any open edge of the booth wall which is proximal to the examining table.  Be placed to allow the operator to use the majority of the available viewing window.		

- f. Each booth shall have at least one viewing device which will:

Be placed to allow the operator to view the patient during any exposure.

Be placed so that the operator has full view of any occupant in the room.

Be placed so that the operator can view any entry into the room.

NOTE: If any door which allows entry into the room cannot be seen from the booth, then that door must be interlocked or stop an exposure when not closed.

- g. When a viewing system is a window:

It shall have a visible viewing area of at least 1 square foot.

The base of the window shall be at least 4.5 feet above the floor.

The distance between the proximal edge of the booth shall not be less than 13 inches.

The glass shall provide the same lead equivalence as that of booth walls.

- h. When the viewing system is by mirrors, the mirrors shall accomplish the general requirements of "F" above.

- i. When the viewing system is by electronic means (e.g., TV, etc.):

The camera shall be so located to accomplish the general requirements in "F" above.

There shall be an alternate viewing system as a back-up for electronic failure.